

CLEAN VERSION OF AMENDED SPECIFICATION PARAGRAPHS

ELECTRONIC ASSEMBLY COMPRISING SOLDERABLE THERMAL INTERFACE

Applicant: Biswajit Sur et al.

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The sub-title on page 1, line 8: Technical Field of the Invention

The paragraph beginning on page 1, line 10:

Embodiments of the present invention relate generally to electronics packaging. More particularly, the present invention relates to an electronic assembly that includes an integrated circuit package comprising a solderable thermal interface between the integrated circuit and a heat spreader to dissipate heat generated in a high speed integrated circuit, and to manufacturing methods related thereto.

The sub-title on page 1, line 16: Background Information

The paragraph beginning on page 3, line 13:

In the following detailed description of embodiments of the invention, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific preferred embodiments in which the subject matter may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice them, and it is to be understood that other embodiments may be utilized and that logical, mechanical, and electrical changes may be made without departing from the spirit and scope of the present disclosure. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present disclosure is defined only by the appended claims.

The paragraph beginning on page 3, line 23:

Embodiments of the present invention provide a solution to thermal dissipation problems that are associated with prior art packaging of integrated circuits that operate at high clock

speeds and high power levels by employing a highly conductive solder material as a thermal interface between an IC die and a heat spreader. Various embodiments are illustrated and described herein.

The paragraph beginning on page 4, line 15:

FIG. 1 is a block diagram of an electronic system 1 incorporating at least one electronic assembly 4 with a solderable thermal interface in accordance with one embodiment of the invention. Electronic system 1 is merely one example of an electronic system in which the present subject matter can be used. In this example, electronic system 1 comprises a data processing system that includes a system bus 2 to couple the various components of the system. System bus 2 provides communications links among the various components of the electronic system 1 and can be implemented as a single bus, as a combination of busses, or in any other suitable manner.

The paragraph beginning on page 5, line 17:

FIG. 2 illustrates a cross-sectional representation of an integrated circuit (IC) package, in accordance with one embodiment of the invention. The IC package comprises a die 50 mounted on an organic land grid array (OLGA) substrate 54, and a lid or integrated head spreader (IHS) 52. While an OLGA substrate is shown, embodiments of the present invention are not limited to use with an OLGA substrate, and any other type of substrate can be employed

The paragraph beginning on page 6, line 20:

While a BGA arrangement 56 is illustrated in FIG. 2 for coupling OLGA substrate 54 to substrate 70, embodiments of the present invention are limited to use with a BGA arrangement, and they can be used with any other type of packaging technology, e.g. land grid array (LGA), chip scale package (CSP), or the like. Further, embodiments of the present invention are not to

be construed as limited to use in C4 packages, and they can be used with any other type of IC package where the herein-described features of the present subject matter provide an advantage.

The paragraph beginning on page 7, line 1:

In order to successfully fabricate an IC package with the advantages described above, it is important to have a die surface that is readily solderable. It is also important to have an IHS that is readily solderable. In addition, it is important to use a suitable solder material. Further, it is important to utilize a suitable process for forming a reliable thermal interface between the die and the IHS. Each of the above-mentioned factors will now be described in sufficient detail to enable one of ordinary skill in the art to understand and practice the subject matter.

The paragraph beginning on page 10, line 6:

The particular implementation of the IC package is very flexible in terms of the orientation, size, number, and composition of its constituent elements. Various embodiments of the invention can be implemented using various combinations of substrate technology, IHS technology, thermal interface material, and sealant to achieve the advantages of the present disclosure. The structure, including types of materials used, dimensions, layout, geometry, and so forth, of the IC package can be built in a wide variety of embodiments, depending upon the requirements of the electronic assembly of which it forms a part.

The paragraph beginning on page 10, line 14:

FIGS. 2 and 3 are merely representational and are not drawn to scale. Certain proportions thereof may be exaggerated, while others may be minimized. FIGS. 2 and 3 are intended to illustrate various implementations of the subject matter that can be understood and appropriately carried out by those of ordinary skill in the art.

The paragraph beginning on page 12, line 1:

The present subject matter provides for an electronic assembly and methods of manufacture thereof that minimize thermal dissipation problems associated with high power delivery. An electronic system and/or data processing system that incorporates one or more electronic assemblies that utilize the present subject matter can handle the relatively high power densities associated with high performance integrated circuits, and such systems are therefore more commercially attractive.

The paragraph beginning on page 12, line 9:

As shown herein, the present subject matter can be implemented in a number of different embodiments, including an assembly for a die, an integrated circuit package, an electronic assembly, an electronic system, a data processing system, and a method for packaging an integrated circuit. Other embodiments will be readily apparent to those of ordinary skill in the art. The elements, materials, geometries, dimensions, and sequence of operations can all be varied to suit particular packaging requirements.

The paragraph beginning on page 12, line 16:

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement that is calculated to achieve the same purpose may be substituted for the specific embodiment shown. This application is intended to cover any adaptations or variations of the present subject matter. Therefore, it is manifestly intended that embodiments of this invention be limited only by the claims and the equivalents thereof.